Western Delta Shallow Water Habitat Mapping Project

#0059

Technical Panel Review

Proposal Name: Western Delta Shallow Water Habitat Mapping Project

Applicant Organization: Fishery Foundation of California

Principal Lead Investigator(s):
Kennedy, Trevor
Thomas, Cannon

Amount Requested: $365,378

TSP Panel Summary of Findings:

This project proposes to develop a GIS database of shallow-water habitats from the northeast tributaries down to the western Delta and to conduct statistical analysis related to prior fish survey data, in support of important activities such as DRERIP and POD. While the need does exist for more spatially explicit and validated habitat data for the Delta, this project does not rise to the CALFED Science Program needs for a number of reasons: 1) This project is primarily a GIS mapping and database development effort aimed at filling a data gap, and the proposal was weak in how the mapping and analysis would be done. 2) While the project aims to conduct some comparative analysis of GIS data to fish survey data and habitat descriptive information, it does not contain any hypotheses regarding what habitats are important to any particular fish species and why and thus where it should focus its efforts; instead it hypothesizes that shallow-water habitats are limited, degraded, and under stress. There is no definition of shallow water habitat. Such an approach does not represent a strong science-based effort that will fundamentally advance the understanding of the complex environments of the Delta. 3) As the external reviewers point out, it does not indicate any knowledge of or intent to draw upon existing GIS data resources for the Delta, creating a strong potential for duplication of effort. There is a lot of GIS data currently available, but it appears that project proponents are proposing to start from scratch. 4) The proposal does not adequately describe its basis for developing

and analyzing data to fulfill its objectives, leaving us unclear in its ability to meet its objectives. For example, they state "we propose to synthesize ... fish survey data into the GIS database development," but we are not told whether the data will be from one season or another, or from which year (will it be averaged across years?). Or perhaps it will be synthesized in relation to drivers that are mentioned (e.g., salinity). If the latter, this would be particularly useful information, but the panel has little confidence that this is the case. 5) Project proponents did not sufficiently document their expertise to perform this work. The lead invesigators appear qualified to judge fish, but not the GIS componant, which was not described. 6) Finally, because of its nature as a habitat mapping project and one that could provide real value if reviewers' comments are addressed, it may be more suited to a directed action from ERP. There may also be other current efforts currently underway that might be better suited to assume this task.

Relevance to PSP Topic Areas:

High

TSP Technical Rating:
Inadequate

TSP Funding Recommendation:
Do Not Fund

TSP Amount Recommended: $**0**

Conditions:

External Technical Review #1

Proposal Title: Western Delta Shallow Water Habitat Mapping Project

Proposal Number: 0059

Proposal Applicant: Fishery Foundation of California

Purpose

Comments	**The purpose of the project is clearly stated, and if successful would provide a valuable link between fish use and habitat types. The idea is timely, as such merging of GIS databases and biological data is rare and can provide much insight into patterns and trends of interactions. Its importance would be gauged by the final results, if the researchers are diligent in producing their stated end-goals such as relating native fish abundances to specific habitats and recommending productive restoration strategies. It is hard to judge if their study is justified relative to existing knowledge (see below under "background"), as the proposal is lacking clear links to recently emerging results from other projects; there certainly are existing data on fish use of habitat types, and GIS mapping. It would be a logical continuation and meaningful development of the fish data that the authors have been and will be collecting in the Delta. Again, whether the results add significantly to the base of knowledge would depend on the author's ability to draw statistically based conclusions and create a useable model of the results, not just a mass of data confined to a technical report. The project doesn't explicitly define novel approaches that will be generated, more the utilization of established techniques to produce relationships between datasets; this would depend on the exact statistical and modeling methods that the author's use and/or develop.**
Rating	**Above Average**

Background

Comments	The conceptual models are there, and are well-defined, as developed by the authors and references to those of other researchers. But, it is hard to tell how they would actually test these conceptual models, and/or add to them. It does adequately demonstrate that there is a clear basis for the proposed work, and that the authors have significantly developed their thoughts on what interactions may be important. This proposal is significantly lacking in references to other literature and projects. It is clear that the authors have sufficient experience in field-sampling of fish, but it is not as clear if they are as thorough in relating their research to other projects, which would be key to the success of their proposal. Some examples of literature that should be cited: "Nobriga M.L. et al., 2005, Fish community ecology in an altered river delta: spatial patterns in species composition, life history strategies, and biomass. Estuaries 28:776-785" (a recent reference that deals with some similar topics), and there is a lack of references to recent GIS mapping in the Delta, including many online GIS resources, and projects such as Susan Ustin et al. mapping of invasive plants in the delta (CSTARS UC Davis), and Patricia Foschi mapping of Egeria Densa (SFSU).
Rating	Sufficient

Approach

Comments	The general approach is well designed for meeting the objectives, but the details are not always well defined. For example, they say "We have developed univariate and multivariate regression and other mathematical based models of fish relationships with their habitat." But, there are no examples of this in the proposal, which would be useful due to the lack of peer-reviewed readily available publications to reference, and that there is only one figure in the

	proposal, and that is a map of the Delta. Some figures or more descriptions of the analysis of the data would be appropriate. The management of the project is well designed, and the resources seem appropriate for this. As stated above, products of value are likely from the project, if the authors can analyze the data in a meaningful way. The plan for data distribution seems adequate, with the typical Calfed Science Conference presentations and web-postings of technical reports. The contributions to larger data management systems is relevant and considered, but the mechanism for this to actually happen isn't explicitly detailed.
Rating	Sufficient

Feasibility

Comments	The approach is generally well documented, but again the actual details on the analysis are not enough to adequately judge. Therefore, the success seems dependent on the quality of the GIS products and subsequent analysis. Additionally, there is no information on the detail of the aerial photographs and GIS analysis. They say that they will obtain the latest high resolution aerial photographs, but are these photographs actually available to them? What is the scale of the photographs? Are they comprehensive of the entire Delta? A lot of this portion of the proposal depends on in-kind matching from Wildlands, so without more details I am less able to judge how feasible their approach is. I'm not questioning their abilities or project outline, just the availability of the data that they will need in order for the project to be successful.
Rating	Sufficient

Budget

Comments	I think the budget is reasonable, and would be very cost-effective if meaningful products can be generated, especially with the in-kind matching of the

	GIS services, and the already funded fish sampling that is ongoing. The only minor discrepancy that I noticed in their budget involves Task 3: the justification says that Task 3 is confined to year 1, but the budget breakdown has year 1 and year 2. This includes 15K for travel, which I assume is for the 48 days of field ground-truthing, but a specific travel budget in the justification would be nice (does this include boat time?). There is no description of the details of the ground-truthing to understand would sort of travel would be involved.
Rating	Above Average

Relevance To CALFED

Comments	I think that their overall purpose generally touches on a few very meaningful aspects that would be quite relevant to CALFED. Linking fish communities to shoreline characteristics would be very useful to the priorities stated in the PSP, which the authors adequately outline. Again, the usefulness of the resulting information would ultimately depend on the quality of the analysis and data distribution. The potential is certainly there, but it is hard to say based on the detail of the proposal if this will actually happen.
Rating	Sufficient

Qualifications

Comments	The overall infrastructure and qualifications of the authors appear to be all in order, as generally described in the proposal. However, they are lacking information on peer-reviewed literature by the authors, as there is nothing in the literature cited, and only a few technical reports listed in their qualifications. Therefore, I have no way of knowing their analysis/modeling skills and dedication to producing peer-reviewed

	articles.
Rating	Sufficient

Overall Evaluation Summary Rating

Comments	I would like to better rate this proposal, as I think the overall ideas are well constructed, and could lead to a very enlightening research project. My rating of "sufficient" instead of "above average" mostly has to do with the previously mentioned lack of information in the proposal dealing with such important aspects as data development and analysis; again, I'm not suggesting the authors won't be able to do what they outline, just that there is not enough information detailed in the proposal for me to adequately judge the success of the project if it were to be funded.
Rating	Sufficient

External Technical Review #2

Proposal Title: Western Delta Shallow Water Habitat Mapping Project

Proposal Number: 0059

Proposal Applicant: Fishery Foundation of California

Purpose

Comments	**The purpose and need for the project appear very sound. The goals are clearly stated: to map and describe shallow water fish habitat in the Delta using a variety of physical, biological, land use and chemical parameters. The objectives are clear: to create GIS habitat maps to analyze use patterns, inform restoration, and track change over time. The hypotheses, however, are unfortunately muddled and poorly stated. The proposal has a significant disconnect between the reported experience and familiarity of the principal investigators at the Fishery Foundation of California (FFC) with the available data and habitats with their clear articulation of hypotheses, data sources, and mapping criteria and methods. The project appears well-suited and central to CALFED's priorities, and if done well could serve as a valuable tool to not only restore habitats and improve target species populations, but also to estimate the expected biological effects future management actions related to water supply, stream flow, salinity, and flood control in the Delta.** **The results of the project could be a valuable synthesis of existing spatial, quantitative, and categorical data distilled into useful format for interpretation, analyses, and planning for any number of projects and**

	purposes. The results have good potential to not just add to the knowledge base but to understand functional relationships in Delta fish habitats, and lead to the formulation of new conceptual models.
Rating	**Above Average**

Background

Comments	**The proposal has no articulated conceptual model, and does a poor job detailing the existing level of information or sources of data that it will rely on and build upon. The proposal only makes casual comments on the types of data it will use and provides virtually no documentation or description of that data or description of how it would be obtained or interpreted. Fundamentally, the existing data that this project depends upon is not documented or described, nor are its sources cited in the text of bibliography. In short, the basis for the work is lacking in the proposal. Demonstrating a clear understanding of the types of existing data, and how it would be used, transformed, acquired, and interpreted for this project is necessary background information. The proposal unfortunately lacks this essential background information.**
Rating	**Inadequate**

Approach

Comments	**The approach lacks any detail as to how the work will actually be accomplished, and creates more questions than answers. A key example of this is the repeated statement throughout that shallow water habitat types will be mapped on aerial photos "based on readily identifiable physical, chemical, and biological characteristics." There are two ways to interpret this statement. The first is absurd– that chemical parameters for aquatic habitats can be divined from an aerial photograph. The second is more realistic– that**

the proposal simply does not provide its methodology for accomplishing the work. The lack of any suitable description of the approach is a fatal flaw in the proposal.

No where does the proposal clearly define or list the habitat parameters of interest. No methodology is provided as to how or which types of aquatic habitats can be mapped from an aerial photo. The lack of any real description of the mapping criteria that will be used, or how data will be gathered, transformed (e.g., from point data to polygon data), and integrated creates more questions than answers. To strengthen their proposal, the applicants need to provide something as simple as a table that lists the types of physical, chemical, and biological data, their sources (with citations where necessary), data types (categorical, integer, etc.), units of measure and spatial resolution, and how it will be transformed (e.g., integer into categories). In order to explain their approach with the data, the proposal needs to provide a conceptual model with hypotheses that provides some insights into how the analysis will be accomplished.

The proposal needs to clearly state its mapping methods and criteria for each data type, how habitat types will be categorized, and what metrics and thresholds would be used. To use the example of chemical parameters, it can be assumed (but no where does the proposal state this) that spatial and temporal salinity data should be available as an existing base layer in GIS with polygons that can be overlaid onto aerial photos. The proposal needs to state data sources, provide some information on how data collected at different spatial or temporal scales (such as salinity) will be integrated into a single relational data base, and ultimately, and what categories are expected to be critical for defining habitat types.

	While the proposed project is attempting to build a relational data base that could be used to create and interpret new conceptual models of habitat use and availability, the proposal lends no confidence that the available data are suitable for this purpose, nor does it provide any insights has to how the work will actually be accomplished. In essence, the proposal needs to describe its own conceptual model on how all the data will fit together through some distillation process, and what decision making criteria will be used to categorize the data, and ultimately what habitat types will be defined. In order to accomplish this, the approach needs a clear hypothesis to be tested. **It is unfortunate that the proposal lacks any description of the habitat types or criteria that will be used to define habitat types. While the proposal makes several good statements of the potential end uses of the maps and database, we have no idea what the actual product will look like or how it will be derived.** **Another disconnect in the approach is the element of ground truthing. First, it is unclear which data would be ground truth; second, it is not clear how it would be truthed (measurements, observations, collections); and third the ground truthers are not the key experienced staff. The proposal states that Kennedy and Cannon have 5 years of shallow water habitat field experience in the Delta, but then assigns Burr, Walker and Kessler (no resumes provided) with field work to conduct ground truthing. So on the one hand the proposed work seems to build on the years of direct experience on the principle investigators, but then their involvement in the field to ground truth and delineate habitats is minimal.**
Rating	**Inadequate**

Feasibility

Comments	**The approach is not documented enough to discuss its feasibility. As discussed above, the proposal needs a matrix or table outlining all the data sources and transformations, and it needs to provide some description of how the data will be integrated and interpreted. While it intends to define shallow water habitat types, the proposal fails to define shallow water habitat, sub-types of shallow water habitats, and key parameters it expects to use or investigate to distinguish habitat types. To accomplish this, the proposal needs to develop its own conceptual model and hypothesis that will be tested through statistical analyses. Presumably, the final habitat maps will then be based on their experienced interpretation of the analytical results. While the principal investigators appear to have the direct experience and knowledge to provide this greater detail on how they would accomplish the work, the proposal truly lacks any clearly articulated path between the proposed idea and the end deliverable.**
Rating	**Inadequate**

Budget

Comments	**The budget outline is clear, and the salaries and overhead appear reasonable in relation to the overall cost of the project. However, because the approach is so poorly articulated, it is difficult to determine if the budge is adequate to accomplish the proposed work.**
Rating	**Inadequate**

Relevance To CALFED

Comments	**The proposal appears to be highly relevant to CALFED, and could be a useful integration and synthesis of existing information into a working habitat model for shallow water aquatic habitats in the Delta. Such a model could be a very useful analytical tool for**

	evaluating potential effects of water diversion projects, flood control projects, and restoration projects. As such, it could be valuable for resource managers and decision makers. Beyond this potential or promise, however, the proposal lacks sufficient detail to provide confidence that the work would be completed and a useful product created.
Rating	Above Average

Qualifications

Comments	The principal investigators, Kennedy and Cannon, appear to have the necessary experience and technical background to accomplish the project based on the resumes provided. The remainder of the proposal lacks sufficient information to determine if other team members are qualified to complete their tasks, or if they have the technical abilities and facilities to accomplish the GIS work. No information is provided on how the actual data gathering and mapping would be completed, nor is information provided on the working partnership between the FFC and Wildlands, Inc. to clearly understand roles and responsibilities.
Rating	Inadequate

Overall Evaluation Summary Rating

Comments	The proposed project has great value. I would encourage the principal investigators to re-submit a proposal that demonstrates their familiarity and ability to work with and integrate the various data sources necessary for the project, that articulates their approach, that provides detailed information on the data, data sources, and transformations necessary, and provides a conceptual model and working hypothesis on the habitat types that would be mapped and described.

Rating	**Inadequate**

External Technical Review #3

Proposal Title: Western Delta Shallow Water Habitat Mapping Project

Proposal Number: 0059

Proposal Applicant: Fishery Foundation of California

Purpose

Comments	**Overall, this is a very strong proposal.** **The proposed work will form the basis for the development of fish habitat models to better understand habitat associations for both desirable and undesirable species. A much improved understanding these species−habitat associations for the delta at this broad spatial scale will derive from this work. I could imagine that this habitat mapping study would serve as a foundation for a wide range of other projects focused on the distribution, ecological value, restoration and preservation of shallow water habitat in the delta.**
Rating	**Superior**

Background

Comments	**Overall, yes. More detail about the statistical approaches to be used (besides just listing them) would have been helpful, but this is by no means a fatal flaw.**
Rating	**Above Average**

Approach

Comments	**GIS methodologies are appropriate, and the investigators have previous experience with this type of analysis. One concern that is not fully acknowledged in the proposal is the dynamic nature of**

	shallow water habitats – some areas may be inundated for short periods of time during the year, and the period of inundation may vary widely among years. For these reasons, linking fish presence–absence data to conditions at a site (collected at different times of year and different years) may be problematic, and would not yield insights into the importance of different areas as spawning or rearing sites. **The plan to make this information widely available in a GIS format is an important strength.**
Rating	**Superior**

Feasibility

Comments	**Yes. The proposed work seems realistic. It builds on previous extensive fish sampling in the delta that has been compiled into an existing database. And the investigators have been involved in this type of habitat mapping in other regions. Thus they are experienced with this approach and can build upon previous efforts elsewhere.**
Rating	**Superior**

Budget

Comments	**Looks appropriate to me.**
Rating	**Superior**

Relevance To CALFED

Comments	**It does address several priority research topics, and it builds on existing information and partnerships. Mapping products could be broadly useful to managers for a wide range of applications.**
Rating	**Superior**

Qualifications

Comments	**This appears to be a good team with the ability to successfully accomplish the project. I would have no concerns about lack of facilities or infrastructure needed to complete the project.**
Rating	**Above Average**

Overall Evaluation Summary Rating

Comments	**Despite these minor concerns noted above, I believe that this will be an extremely important project that will provide an important piece of information of great value in future efforts aimed at understanding and managing the delta ecosystem.**
Rating	**Superior**